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United States Department of Agriculture,

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A. C. True, Director.

SECONDARY COURSES IN AGRICULTURE.

[Extract from the Seventh Report of the Committee on Methods of Teaching Agriculture.][a]

Interest in matters relating to instruction in agriculture of a grade lower than that properly included in the college course has been growing rapidly in different parts of the United States. This is a matter vitally connected with the further development of our agricultural colleges. If the movement is rightly guided it may also widely improve the opportunities for agricultural education which will be made available to the young people on our farms. Your committee has therefore thought it wise that it should give some attention to this phase of agricultural education, and should at least call the attention of this association to the pressing need for the establishment of institutions and courses for secondary instruction in agriculture.

Broadly speaking, the system of public education in the United States has now reached a stage where the secondary schools and courses are being much more clearly differentiated from the institutions and courses of lower and higher grade. Standards of education are being established which more clearly fix the boundaries of elementary education through a system of graded common schools. Next above this we recognize the secondary or high schools. These are no longer regarded as essentially or chiefly preparatory schools for the colleges. On the other hand, their courses are being continually broadened with reference to the varying needs of students who are to pass from them directly into the various pursuits and industries of our American communities.

The high schools in our larger towns and cities are being especially developed with reference to different forms of commercial business and

[a] Committee of the Association of American Agricultural Colleges and Experiment Stations, whose seventh report was presented to the convention of the association held at Atlanta, Ga., October 7–9, 1902. The extract given in this circular includes the subject principally discussed in that report. For previous reports see U. S. Dept. Agr., Office of Experiment Stations Buls. 41, p. 57; 49, p. 29; 65, p. 79; 76, p. 39; 99, p. 86; and 115, p. 56; and Circs. 32, 37, 39, 41, and 45.

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manual arts. With the development of the high schools the work of the colleges is being more and more relegated to grades of instruction above those of the high school, and for this reason the requirements for entrance to the colleges are being raised and the preparatory work which many of the colleges have hitherto done is either being cut off entirely from these institutions or is being organized in a way which clearly differentiates it from the college work proper.

In order to bring agricultural instruction in line with the prevailing movement regarding secondary schools and courses, several changes in our existing school system are required.

SECONDARY AGRICULTURAL EDUCATION IN CONNECTION WITH COLLEGES.

The college courses in agriculture should be made of real college grade, as recommended in previous reports of this committee and in a report of the committee of this association on entrance requirements. This would require that those agricultural colleges now receiving students directly from the common schools should either raise their requirements for admission and abolish their courses of lower grade, or else should raise their requirements for the bachelor's degree and differentiate the preparatory or secondary courses which they offer from those of college grade. A movement in these directions is already in progress and should be encouraged to proceed further.

Experience at the Minnesota Agricultural College and elsewhere seems to indicate that it is desirable that the secondary instruction given in connection with our agricultural colleges should be more formally organized as a thing separate from the college courses in agriculture. In this way agricultural high schools may be established in connection with the colleges, which will offer students an opportunity to pass through a secondary course complete in itself, thus giving them a large part of the general education ordinarily acquired in the high school, together with some definite training in agricultural subjects.

It is believed that this is a better plan than to institute courses which are merely preparatory to the college courses given in the same institution. Whether such secondary courses should be indefinitely continued in connection with our agricultural colleges is indeed problematical, but as many of our colleges are now organized it would not at present be practicable to wholly cut off the secondary instruction. It will, however, be a great gain to have the secondary instruction in agriculture, as in other subjects, clearly differentiated from the college courses in the mind of both the students and the public. And under present conditions many of our agricultural colleges may in this way contribute to the movement for the definite organization of secondary instruction in agriculture in the United States. But it is clear that whatever aid existing agricultural colleges may give in this direction, it will be

desirable to establish and support special high schools in which instruction in agriculture shall be given. The movement in this direction has already begun and undoubtedly will continue and increase.

AGRICULTURAL HIGH SCHOOLS.

The establishment of separate agricultural high schools in Alabama, Wisconsin, and California is without doubt the beginning of a movement which, if successful, will spread throughout the Union. These agricultural high schools will be equivalent to the manual training or technical high schools which are being established in the cities, though it is probable that they will be organized under State rather than local control. It is desirable that they should be so located and organized as to equalize as far as practicable the opportunities of all the youth of the agricultural communities for instruction in agriculture. To do this may involve provision not only for free tuition, but also for State aid toward the transportation of pupils according to their distance from the school.

AGRICULTURAL COURSES IN TOWN HIGH SCHOOLS.

In addition to provision for instruction in agriculture in connection with the colleges and in special agricultural high schools the teaching of agriculture should be introduced into the public high schools in or near the rural communities. There are many villages and cities in the United States which are dependent on the farms surrounding them for their commercial prosperity, if not for their very existence. The high schools maintained in these places draw their students largely from the farms. There is good reason why communities of this kind should seek through their schools to promote the interests of the industry to which they owe so much. They should at least cooperate with the surrounding rural communities to secure for the farmers' children technical education in agriculture parallel to the education in commercial business and mechanic arts which many of the city high schools are now offering to their students.

As previously stated, the high-school system of the United States has been rapidly developed in the past few years in the direction of broadening the courses in natural science and industrial arts and in the provision for numerous elective courses in these and other subjects. While it continues to supply college preparatory courses for the limited number of students intending to pursue their school career beyond the high school, its chief business is to educate the nine out of every ten of its students who are to step from its halls into active life. In our largest and wealthiest cities this change of aim of the high school has led to the establishment not only of numerous courses in the classics, modern languages, natural sciences, mathematics, history, and political economy, but also of separate high schools with elaborate courses in busi-

ness forms and mechanic arts. The smaller cities are striving to follow in the same path as far as their means will permit.

Agriculture has thus far been almost entirely neglected in the high-school programmes, and it is high time that the friends of agricultural education should make a systematic effort to have the claims of this fundamental industry acknowledged and satisfied in the curricula of the public high schools. Since successful agriculture is essential to the prosperity and well-being of urban as well as rural communities, there should be cooperation between country districts, villages, cities, and the States to provide the means for the maintenance of agricultural courses in the high schools. As a practical measure it is believed that such courses may be added to these already existing in many high schools by the addition of a single teacher, who should be an agricultural college graduate, to the teaching force already supplied. The expense of maintaining this teacher and his equipment may properly be shared by the State, the village, or city maintaining the high school and the country district from which the pupils from the farms are drawn to this school. The State may properly aid this movement by offering a stated sum annually to high schools maintaining agricultural courses. Already many small townships are paying the tuition of pupils attending high schools in neighboring townships, and this system should be extended with the proviso that such tuition fees paid for students desiring agricultural courses should be devoted to the maintenance of agricultural courses. The balance necessary to maintain these courses will, it is believed, be cheerfully paid by the villages or cities maintaining the high schools as soon as they realize that such expenditure is in the nature of an investment, the returns from which in the way of better and more abundant agricultural products will be certain and remunerative.

In order that it may be apparent that agricultural courses may be offered in the high schools without any violent or radical reorganization of existing programmes for such schools, a number of tentative schedules for such courses are presented herewith along with various courses already existing in high schools in different parts of the country. An examination of numerous high-school programmes has revealed a very great variety in their courses as regards the number of different branches and the amount of time devoted to each branch in any particular course. In general, however, it may be said that the average high-school course in this country presupposes that the student has had an eight-year course in a primary school, where he has been taught reading, writing, spelling, arithmetic, elements of English grammar and composition, geography, and United States history. The best primary schools also give some instruction in drawing, music, nature study, and woodworking, or sewing and cooking. The high-school course covers four years and will ordinarily embrace instruction in algebra, geometry,

ancient and modern history, English, drawing and music, together with various combinations of Latin, Greek, French, German, and the elements of natural sciences (especially chemistry, physics, and botany). Whenever the manual arts or the natural sciences are largely introduced into high-school courses the practical effect is to reduce the amount of time given to the ancient and modern languages. With improved instruction in English and science the effect of this on the general training of the student is not as marked as it might otherwise be, and whatever the theoretical pedagogical value of instruction in ancient or modern languages, there is little doubt that when a choice has to be made between these subjects and those which relate directly to the pursuit by which the pupil is to gain his livelihood, it will in most cases be desirable that he shall choose the things of most direct benefit in his life work. That it will not always be necessary for the student of agriculture to entirely neglect the study of at least one ancient or modern language in this high-school course, provided his tastes or attainments lead him in that direction, may be seen from examination of the programmes of courses presented herewith.

With the introduction of agriculture into the high-school course it is presumed that the courses in physics, chemistry, botany, and zoology will be so shaped as to form an appropriate introduction to the more formal instruction in the different branches of agriculture, i. e., agronomy, zootechny, dairying, rural engineering, and rural economy. As indicated in previous reports of this committee, we would include under agronomy whatever is taught regarding climate, soils, fertilizers, and the botany, varieties, culture, harvesting, preservation, uses, and enemies of farm crops: under zootechny, the theory and practice of animal production, including the breeding, feeding, hygiene, and management of farm animals; under dairying, the principles and methods involved in the handling and sale of milk for consumption and in the making of butter and cheese; under rural engineering, principles and methods involved in the laying out of farms, and the construction and use of farm buildings, systems for water supply, irrigation, drainage, sewage, roads, and machinery; under rural economy, the history of agriculture, capital, labor systems, cost of production, marketing, records, accounts, etc., as related to farm management.

Beginning with the simpler forms of high-school courses, we present a programme prepared under direction of the State superintendent of public instruction in Indiana, and recommended for use in that State in high schools where at least two teachers are employed exclusively in high-school work, and along with this a tentative agricultural course prepared by your committee, which presupposes an additional teacher.

Programme for high schools in Indiana.[a]

FIRST YEAR.

General course.		Tentative agricultural course.	
Algebra	5	English	5
English	5	Algebra	5
Latin	5	Plants and their cultivation (i. e., botany—general and economic)	5
Physics or chemistry	5	Physics	5

SECOND YEAR.

Algebra (one-third year)	5	English	5
Geometry (two-thirds year)	5	Algebra Geometry	5
English	5	Animals and their management (i. e., zoology—general and economic)	5
Latin	5	Chemistry	5
History	5		

THIRD YEAR.

Geometry (two-thirds year)	5	English	5
Elective[b] (one-third year)	5	Geometry, Latin, or German	5
English	5	Agronomy (with special attention to local crops)	5
History	5	History	5

FOURTH YEAR.

Elective[b]	5	History	5
Zoology or botany	5	Political economy	5
Latin	5	Zootechny and dairying	5
History	5	Latin or German	5

[a] With each subject the number of recitation periods per weeks is given.
[b] Mathematics, physical geography, oratory, or advanced physiology.

With the introduction of agriculture into high schools of this kind the division of studies among three teachers might be as follows:

A.	B.	C.
English.	Chemistry.	Physics.
Latin.	Botany.	Mathematics.
German.	Zoology.	History.
	Agriculture.	Political economy.

Teacher B should be an agricultural college graduate and would ordinarily be a man, who might be the principal of the school. Teachers A and C would ordinarily be women.

As an example of a high school in a city of medium size, that of Lowell, Mass. (population, 95,000; chief industry, cotton manufacturing), has been selected.

Eight courses are offered, but only the classical, modern language, and manual-training courses, recommended as general training courses, are given herewith. Studies in *italics* are elective.

Programme of Lowell (Mass.) High School.[a]

FIRST YEAR.

Classical course.	Modern-language course.	Manual-training course.	Tentative agricultural course.
English 5	English 5	English 5	English 5
Algebra 5	Latin 5	Algebra 5	Algebra 5
Latin 5	Algebra 5	Manual training 5	Plants and their cultivation (i. e., botany—general and economic) 5
Physical geography . 2½	*Physical geography* .. 2½	*Physical geography* .. 2½	Physics 2½

SECOND YEAR.

History and English. 5	History and English 5	History and English 5	History and English 5
Geometry 5	Physics 5	Manual training ... 5	Animals and their management (i. e., zoology—general and economic) ... 5
Physics 5	*Geometry* 5	*Geometry* 5	*Chemistry* 5
Latin or *French* 5	*French* 5	*Physics* 5	*Geometry* 5
		French 5	*French* or *Latin* 5

THIRD YEAR.

History and English 5	History and English 5	History and English 5	History and English 5
Arithmetic 2½	*Arithmetic* 2½	Manual training ... 5	Agronomy and rural engineering .. 5
Physiology 2½	*Physiology* 2½	*Arithmetic* 2½	*Arithmetic* 2½
Chemistry 2½	*Chemistry* 2½	*Physiology* 2½	*Physiology* 2½
German 5	*German* 5	*Chemistry* 5	*Chemistry* 5
Latin 5	*French* 5	*German* 5	*French* or *German* or *Latin*[c] 5
Astronomy and *geology*[b] 5	*Astronomy* and *geology*[b] 5	*French* 5	*Astronomy* and *geology*[b] 5
		Astronomy and *geology*[b] 5	

FOURTH YEAR.

English 5	English 5	English 5	English 5
History 5	*History* 5	Manual training ... 5	Zootechny and dairying 5
Chemistry 5	*Chemistry* 5	*History* 5	*History* 5
German 5	*German* 5	*Chemistry* 5	*Rural economy* and *farm management* . 2½
Latin 5	*Botany* 2½	*German* 5	*Entomology* 2½
Botany 2½		*French* 5	*Trigonometry* and *surveying* 5
		Geometry and *trigonometry* 5	

[a] With each subject the number of recitation periods per week is given.
[b] May be taken the fourth year instead of the third.
[c] Whatever language is elected should be continued through at least two years.

Another example of a high school in a city of medium size has been selected, viz, Des Moines, Iowa (population, 62,000), which is in the midst of a rich agricultural district. This illustrates a course of study in which the elective system predominates. By simply adding to the

curriculum for the second, third, and fourth years, electives in agriculture, a course of study much better adapted to the needs of pupils from the rural districts could be arranged.

Programme of Des Moines (Iowa) High School.[a]

FIRST YEAR.

Present course of study.		Tentative agricultural course.	
Algebra	5	Algebra	5
Zoology	2½	Zoology	2½
English	3	English	3
Drawing	2	Drawing	2
Botany	2½	Botany	2½
Latin	5	*Latin*	5
Physical geography	2½	*Physical geography*	2½
Geology	2½	*Geology*	2½

SECOND YEAR.

Algebra	2½	Algebra	2½
Geometry	2½	Geometry	2½
English	2½	English	2½
History	5	History	5
Physiology	2½	*Physiology*	2½
Latin	5	*Plants and their cultivation* (i. e., botany—general and economic)	2½
Bookkeeping and commercial law	5	*Animals and their management* (i e., zoology—general and economic)	2½
		Latin	5
		Bookkeeping and commercial law	5

THIRD YEAR.

Geometry	5	Geometry	5
English	5	English	5
Latin	5	*Agronomy and rural engineering*	5
Greek	5	*Latin*	5
German	5	*Greek*	5
French	5	*German*	5
Chemistry	5	*French*	5
Civics and economics	5	*Chemistry*	5
English history	2½	*Civics and economics*	5
American history	5	*English history*	2½
		American history	5

FOURTH YEAR.

Physics	5	Physics	5
English	5	English	5
Latin	5	*Zootechny and dairying*	5
Greek	5	*Rural economy and farm management*	2½
German	5	*Latin*	5
French	5	*Greek*	5
Civics and economics	5	*German*	5
American history	5	*French*	5
Trigonometry	2½	*Civics and economics*	5
Astronomy	2½	*American history*	5
		Trigonometry	2½
		Astronomy	2½

[a] With each subject the number of recitation periods per week is given. Each pupil must take studies occupying at least 15 periods in addition to English. Subjects in *italics* are elective.

As an example of a high school in a large city, that of Washington, D. C. (population 279,000), has been selected. In this city there are also business and manual-training high schools with elaborate special courses. For our present purpose the tentative agricultural course is compared with the courses offered in the general high school.

Programme of Washington High School.[a]

FIRST YEAR.

Academic course.		Scientific course.		Tentative agricultural course.	
English	5	English	5	English	5
History	5	History	5	Algebra	5
Algebra	5	Algebra	5	Plants and their cultivation (i. e., botany—general and economic)	5
Latin	5	German	5	Physics	5
Drawing		Drawing		Drawing or woodworking	

SECOND YEAR.

English English history	5	English English history	5	English	5
Greek	5	Geometry	5	Geometry	5
Geometry	5	German or French	5	Animals and their management (i. e., zoology—general and economic)	5
Latin	5	Physics or chemistry	5	Chemistry	5
Physics or chemistry	5	Drawing		Drawing or woodworking	
Drawing					

THIRD YEAR.

English	5	English	5	English	5
Latin	5	German or French	5	History	5
French	5	*Biology*, or *advanced chemistry*, or *advanced physics*	5	Agronomy and rural engineering	5
German	5	*French*	5	*Biology*	5
Greek	5	Political economy	5	*Trigonometry* and *surveying*	5
Biology or *advanced chemistry*, or *advanced physics*	5	Solid geometry	5	*Latin*	5
Political economy	5	*Trigonometry* and *surveying*, or *history*	5	*German*	5
Solid geometry	5			*Bookkeeping*	5
Trigonometry and *surveying*, or *history*	5			*Drawing*	5

FOURTH YEAR.

English	5	English	5	English	3
Latin	5	German or French	5	Political economy	5
Advanced biology, or *chemistry*, or *physics*	5	Advanced biology, or *chemistry*, or *physics*	5	Zootechny and dairying	5
Greek	5	*History*, or *analytical geometry* and *college algebra*	5	Rural economics and farm management	2
History, or *analytical geometry* and *college algebra*	5	*French*	5	*History*	5
French	5	*Spanish*	5	*Latin*	5
German	5			*German*	5
Spanish	5			*Drawing*	5
				Bookkeeping	5
				Entomology	5

[a] With each subject the number of recitation periods per week is given. Each candidate for a diploma must take studies occupying at least 20 periods, except in the fourth year, when the minimum requirement is 18 periods. Subjects in *italics* are elective.

It is believed that the presentation of schedules as above justifies the assertion that it is entirely practicable to adjust an agricultural course of high-school grade to existing high-school schedules and to make this agricultural course fairly satisfactory for the purposes of general training, as well as elementary instruction in the theory and practice of agriculture. The graduate of such an agricultural course may fairly be expected to understand the scientific basis of improved agriculture and to have an intelligent appreciation of the needs of a progressive agriculture. He will then be in a position to profit by the results of the investigations of the experiment stations and by the information regarding the progress of his art which may come to him from the more intelligent of his neighbors, farmers' institutes, and good books and journals. He will be likely to become an intelligent and progressive farmer as well as a refined and useful citizen and homemaker.

In the present condition of secondary education in this country there is no room for dogmatism regarding courses of study, but there is every reason why the friends of agricultural education should assert their right to be heard in claiming the importance, desirability, and feasibility of including instruction in agricultural subjects in high-school programmes. Your committee has proceeded on the assumption that the definite formulation of tentative secondary courses in agriculture would contribute to the more intelligent discussion of this important subject. If continued, it may hereafter give more attention to this subject and report such further suggestions as more extended study may bring out.

A. C. True,
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Committee.

Recommended for publication.
A. C. True, *Director.*

Publication authorized.
James Wilson, *Secretary of Agriculture.*

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